REMARKS

Status of the Claims

Claims 5-9 are pending in this application, the only independent claim being claim 5. By this Amendment, the specification (title) and claims 5-9 are amended; claims 1-4 previously were cancelled.

Summary of the Official Action

In the Official Action, the specification (title) and claim 5 were objected to on formal grounds. Claims 5-8 were rejected under 35 U.S.C. 102(b), as anticipated by U.S. Patent No. 6,157,526 (Watanabe).

Allowable Subject Matter

Initially, Applicants gratefully acknowledge the Examiner's indication that the Application contains allowable subject matter, and that claim 9 is allowable over the prior art. Applicants believe that amended claim 9 remains allowable over the prior art for the same reasons.

Formal Amendment

The specification (title) has been amended to correspond more clearly with the claimed invention, as requested by the Examiner. No new matter has been added.

The objection and rejection of the claims respectfully are traversed. Nevertheless, without conceding the propriety of the objection and rejection, claims 5-9 have been amended more clearly to recite various novel features of the claimed invention. Support for the amendments may be found in the original application, including original Fig. 3, the description and the claims. Moreover, Applicants submit that the amendments merely clarify the claim language, and therefore merely are formal in nature and do not narrow the scope of the claims. No new matter has been added.

Claimed Invention

The present invention relates to a novel method for fabricating a thin film magnetic head including a magnetoresistive effective type thin film magnetic head element. Referring to the exemplary embodiment illustrated in Fig. 3, the magnetoresistive effective type thin film magnetic head comprises a first and a second magnetic shielding films which are made of magnetic material, a first and a second shielding gap films which are made of non-magnetic material and located between the first and the second magnetic shielding films, a magnetoresistive effective element film which is located between the first and the second shielding gap films, a first and a second longitudinal bias-applying films which are located at respective side edges of the magnetoresistive effective element film, and a first and a second electrode films which are located so as to cover top surface edge portions of the magnetoresistive effective element film beyond the first and the second longitudinal bias-applying films. The method comprises the steps of:

forming the first shielding film on a substrate,

forming the first shielding gap film on the first shielding film,

forming a magnetoresistive effective film on the first shielding gap film,

partially etching and removing the magnetoresistive effective film using a first mask fabricated thereon to pattern and form the magnetoresistive effective element film,

forming the first and the second longitudinal bias-applying films using first mask, at respective side edges of the magnetoresistive effective element film, so that the difference in surface level between the magnetoresistive effective element film and the first and the second longitudinal bias-applying films is set within ±20 nm,

forming the first and the second electrode films so as to cover top surface edge portions of the magnetoresistive effective element film and the first and the second longitudinal bias-applying films,

forming the second shielding gas film so as to cover the magnetoresistive effective element film, the first and the second electrode films, and

forming the second shielding film on the second shielding gap film.

As discussed in greater detail in the specification, by forming the first and the second longitudinal bias-applying films at respective side edges of the magnetoresistive effective element film, so that the difference in surface level between the magnetoresistive effective element film and the first and the second longitudinal bias-applying films is set within ±20 nm, it is possible to reliably manufacture multiple thin film magnetic heads including a magnetoresistive effective type thin film magnetic head element on a single substrate, which provides a significant improvement in commercial manufacturing (see, e.g., paragraphs nos. [0011]and [0030]).

Prior Art Distinguished

Applicants submit that the prior art fails to anticipate the claimed invention. Moreover, Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Watanabe '526 patent relates to a magnetoresistive head and magnetic disk apparatus, and discloses a thin film magnetoresistive magnetic head. In particular, the Watanabe '526 patent illustrates in Fig. 2 a thin film magnetic head comprising a lower shield layer 111 and an upper shield layer 112, a lower gap layer 121 and a upper gap layer 122 which are located between the lower and the upper gap layer, an MR film 15 which is located

between the lower and the upper gap layers, longitudinal biasing layers 24 which are located at respective side edges of the MR film, and electrodes 17. In comparison with the thin film magnetic head of the present invention, it may be considered that (1) the lower shield layer 111 and the upper shielding layer 112 correspond to a first magnetic shielding film and a second magnetic shielding film, respectively, (2) the lower gap layer 121 and the upper gap layer 122 correspond to a first shielding gap film and a second shielding gap film, respectively, (3) the MR film corresponds to an MR element film, and (4) the longitudinal biasing layers 24 correspond to a first and a second longitudinal bias-applying films. However, Applicants submit that the Watanabe '526 patent fails to disclose or suggest at least the above-discussed features of the claimed invention. In the Watanabe '526 patent structure, the electrodes are configured such that both edges are contacted only to the respective side edge surfaces of the MR film. Moreover, in the fabricating method of the claimed invention, the first and the second longitudinal bias-applying films are formed so that the difference in surface level between the MR element film and the biasing films is set within $\pm$20nm. In contrast, referring to Embodiment 2 relating to Fig. 4 of the Watanabe '526 patent, the thickness of the MR film is set to 30nm, the thickness of the spacer is set to 20nm, and the thickness of the soft magnetic film 13 is set to 40nm. As a result, the total thickness of the MR element film consisting of the MR film, the spacer and the soft magnetic film is set to 90nm. The thickness of the longitudinal bias layer (the thickness of the underlayer: 10nm, the thickness of the hard magnetic film: 40 nm) is set to 50nm. As a result, in Watanabe, the difference in surface level between the MR film and the longitudinal bias layer is set to 40nm (90nm - 50nm), which does not satisfy the above recited feature of the claimed invention. Nowhere is the Watanabe '526 patent understood to disclose or suggest at least the features of forming a first and a second longitudinal bias-applying films using a first mask, at respective

side edges of the magnetoresistive effective element film, so that the difference in surface level between the magnetoresistive effective element film and the first and the second longitudinal bias-applying films is set within ±20 nm, and forming a first and a second electrode films so as to cover top surface edge portions of the magnetoresistive effective element film and the first and the second longitudinal bias-applying films, as disclosed in the present application and recited in claim 5.

For the above reasons, Applicants submit that claim 5 is allowable over the cited art.

Claims 6-9 depend from claim 5 and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of base claim 5 and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Conclusion

Applicants believe that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action, and submit that the application is in condition for allowance. Favorable consideration of the claims and passage to issue of the application at the Examiner's earliest convenience earnestly are solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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